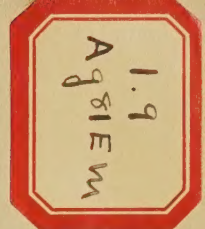
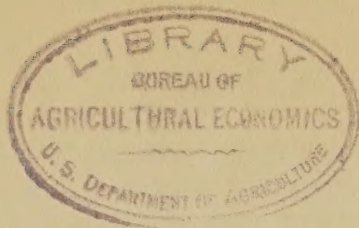


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UNITED STATES

DEPARTMENT OF AGRICULTURE

GRADUATE SCHOOL

MAKING AVAILABLE FACILITIES

For

STUDY AND RESEARCH

(27 Stat. 395)

(31 Stat. 1010)

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Gives statutory authority and purpose of the
Graduate School

WASHINGTON
D.C.

[1934]

THE UNITED STATES

DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

WASHINGTON, D. C.

1917

REPORT OF THE

COMMISSIONER OF LAND MANAGEMENT

FOR THE YEAR 1916

BY

JOHN C. WELLS

CHIEF OF BUREAU

GRADUATE SCHOOL
UNITED STATES DEPARTMENT
OF AGRICULTURE

AUTHORITY

RES. April 12, 1892, No. 8 (27 Stat. 395)

"Whereas, large collections illustrative of the various arts and sciences and facilitating literary and scientific research have been accumulated by the action of Congress through a series of years at the national capital; and

"Whereas it was the original purpose of the Government thereby to promote research and the diffusion of knowledge, and is now the settled policy and present practice of those charged with the care of these collections specially to encourage students who devote their time to the investigation and study of any branch of knowledge by allowing to them all proper use thereof; and

"Whereas it is represented that the enumeration of these facilities and the formal statement of this policy will encourage the establishment and endowment of institutions of learning at the seat of Government, and promote the work of education by attracting students to avail themselves of the advantages aforesaid under the direction of competent instructors; Therefore,

"Resolved, * * * That the facilities for research and illustration in the following and any other Governmental collections now existing or hereafter to be established in the city of Washington for the promotion of knowledge shall be accessible, under such rules and restrictions as the officers in charge of each collection may prescribe, subject to such authority as is now or may hereafter be permitted by law, to the scientific investigators and to students of any institution of higher education now incorporated or hereafter to be incorporated under the laws of Congress or of the District of Columbia, to wit:

- One. Of the Library of Congress.
- Two. Of the National Museum.
- Three. Of the Patent Office.
- Four. Of the Bureau of Education.
- Five. Of the Bureau of Ethnology.
- Six. Of the Army Medical Museum.
- Seven. Of the Department of Agriculture.

Eight. Of the Fish Commission.

Nine. Of the Botanic Gardens.

Ten. Of the Coast and Geodetic Survey.

Eleven. Of the Geological Survey.

Twelve. Of the Naval Observatory.

ACT March 3, 1901, c. 831 (31 Stat. 1010)

"* * * That facilities for study and research in the Government Departments, the Library of Congress, the National Museum, the Zoological Park, the Bureau of Ethnology, the Fish Commission, the Botanic Gardens, and similar institutions hereinafter established shall be afforded to scientific investigators and to duly qualified individuals, students, and graduates of institutions of learning in the several States and Territories, as well as in the District of Columbia, under such rules and restrictions as the heads of the Departments and Bureaus mentioned may prescribe."

In accordance with the purposes of the Government as above enumerated, the collections and laboratories of the Department of Agriculture from their foundation have been made available to qualified students and investigators as far as it was possible to do so. Many workers from American and foreign universities and colleges have availed themselves of these privileges.

The Graduate School of the Department was organized in 1921. Secretary Henry C. Wallace in his report for 1921 said: "To maintain the efficiency in a scientific organization under Civil Service regulations some provision must be made for adequate training of those who enter the service in the lower positions. * * * To meet this need the Department has provided for graduate training in various lines for the scientific workers. The work is given outside of office hours, is supported entirely by the students, and is therefore unofficial in nature. It is, however, supervised and encouraged by the Department. Everything necessary is done to insure the highest standard for the work, so that it will not only be effective training for the Department workers, but satisfactory to the graduate institutions of the country.. It is expected that the ambitious workers of the Department will make arrangements with such graduate institutions for the acceptance of these credits and will ultimately attend these institutions and complete any work required for advanced degrees. Leaves of absence for this purpose are being arranged and closer cooperation with graduate departments in the solution of research problems is being considered.

Some of the strongest scientists of the Department are taking charge of courses and a few of the leading graduate institutions have furnished teachers for others. Altogether a most helpful spirit has prevailed. The interest in the school has grown from year to year. Its work has been strengthened and credits granted have been accepted for graduate and undergraduate credit in all institutions where they have been offered. These include many of the leading universities of the country.

The courses include a wide range of subjects, covering nearly the whole field of the work of the Department and the basic sciences involved; also mathematics and languages.

The number registered ranges between 100 and 500 per semester.

Registration is open to any qualified student. Nearly all Departments of the Government and many universities and colleges are represented.

The work is planned by a Graduate School Council, selected from the leading scientists of the Department.

The Director of Scientific Work is Chairman of the Council and Director of the School.

OFFICERS, COUNCIL, AND INSTRUCTIONAL STAFF

Officers

~~Dr.~~ A. F. Woods, B. Sc., A. M., D. Agr., D. Sc., LL.D., Dean and Director of Agriculture, Forestry, and Home Economics, and President of the University of Minnesota in the absence of President Vincent, 1910-17; President of the Maryland State College and of the University of Maryland, 1917-26; Director of Scientific Work of the United States Department of Agriculture 1926-34; Director of Graduate School and Chairman of Council 1926-

~~Dr.~~ M. C. Merrill, S. M., A. M., Ph. D., Chief Division of Publications, Office of Information, Associate Director of the Graduate School, 1934-

Mrs. N. E. Fealy, Secretary and Registrar, 1926-34.

Mrs. Emma M. Wolfe, Secretary and Registrar, 1934-

Mr. J. J. Ackerman, Treasurer.

Graduate Council

Claribel Barnett, Ph. B., B. L. S., Senior Librarian, Librarian U. S. Department of Agriculture.

W. B. Bell, M. S., Ph. D., Principal Biologist in Charge, Division of Biological Investigations, Bureau of Biological Survey.

H. G. Byers, A. B., B. S., A. M., Ph. D., Principal Chemist in Charge of Soil Investigations, Bureau of Chemistry and Soils.

F. G. Cottrell, B. S., M. S., Ph. D., Chief Fertilizer and Fixed Nitrogen Investigations, now with the Research Corporation of New York.

R. O. E. Davis, Ph. B., Ph. D., Senior Chemist, Division, Transformation of Nitrogen Compounds, Bureau of Chemistry and Soils.

M. Dorset, B. S., M. D., D. V. M., Principal Biochemist, Chief Biochemic Division, Bureau of Animal Industry.

M. S. Eisenhower, B. S., Director of Information, Office of Information.

L. C. Gray, A. B., M. A., Ph. D., LL.D., Principal Agricultural Economist in Charge, Division of Land Economics, Bureau of Agricultural Economics.

W. J. Humphreys, A. B., C. E., Ph. D., Principal Meteorologist in Charge Meteorological Physics, Weather Bureau.

James T. Jardine, B. S., C. E., Chief Office of Experiment Stations.

H. G. Knight, B. A., M. A., Ph. D., Chief Bureau of Chemistry and Soils.

A. G. McCall, B. S., Ph. D., Chief of Soil Investigations, Bureau of Chemistry and Soils.

S. H. McCrory, C. E., A. E., Chief Bureau of Agricultural Engineering.

M. C. Merrill, S. M., A. M., Ph. D., Chief Division of Publications, Office of Information.

L. A. Rogers, B. S., D. Sc., Principal Bacteriologist, Chief Division of Dairy Research Laboratories, Bureau of Dairy Industry.

F. X. Schumacher, B. S., Silviculturist, Division of Silvics, Forest Service.

C. B. Smith, M. S., D. Sc., Principal Agriculturist, Chief Office of Cooperative, Extension Work.

Louise Stanley, B. S., B. Ed., A. B., M. A., Ph. D.,
Chief Bureau of Home Economics.

O. C. Stine, Ph. B., Ph. D., Principal Agricultural Economist in Charge Division of Statistical and Historical Research, Bureau of Agricultural Economics.

W. W. Stockberger, B. S., Ph. D., Director Office of Personnel and Business Administration.

Charles Thom, A. B., A. M., Ph. D., Principal Mycologist in Charge, Soil Microbiology, Bureau of Chemistry and Soils.

C. W. Warburton, B. S. A., D. Sc., Director of Extension Work.

M. B. Waite, B. S., D. Agr., Principal Pathologist, Bureau of Plant Industry.

B. Youngblood, B. S., M. S., Ph. D., Principal Agricultural Economist, Office of Experiment Stations.

Instructional Staff

Ena A. Allen, B. A., M. A., Ph. D., Associate Zoologist, Parasites of Poultry, Bureau of Animal Industry. 1931-32.

C. C. Appleman, Ph. D., Professor of Botany, Plant Pathology, Plant Physiology. Dean of Graduate School, University of Maryland. 1929-30.

Ernst Artschwager, B. S., Ph. D., Pathologist, Division of Sugar Investigations, Bureau of Plant Industry. 1930-32.

A. K. Balls, B. S., Ph. D., Senior Chemist, Food Research Division, Bureau of Chemistry and Soils. 1931-33.

Henry Bartmann, Senior Translator, 1933-34.

L. H. Bean, A. B., M. A., Senior Agricultural Economist Statistics. Statistical Analysis, Bureau of Agricultural Economics. 1926-28, 1929-32.

H. H. Bennett, B. S., Senior Soil Scientist, Soil Erosion Investigations, Bureau of Chemistry and Soils. 1927-29.

S. F. Blake, A. B., A. M., Ph. D., Senior Botanist, Economic and Systematic Botany, Bureau of Plant Industry. 1929-33.

Henry E. Brockway, Senior Translator, Foreign Agricultural Service, Bureau of Agricultural Economics. 1933-34.

Vernon E. Bundy, B. S. Agricultural Editor, Division of Publications, Office of Information, 1932-33.

H. G. Byers, A. B., B. S., A. M., Ph. D., Principal Chemist in Charge, Soil Investigations, Bureau of Chemistry and Soils. 1929-34.

Mrs. Agnes Chase, Associate Botanist, Economic and Systematic Botany, Bureau of Plant Industry. 1926-27.

B. G. Chitwood, A. B., M. S., Ph. D., Associate Zoologist, Miscellaneous Parasites, Bureau of Animal Industry. 1932-34.

E. P. Clark, M. S., Ph. D., Senior Chemist, Insecticidal Plants, Bureau of Chemistry and Soils. 1932-34.

Leland B. Clark, B. S., Assistant in Radiation Research, Smithsonian Institution.

W. Mansfield Clark, A. B., A. M., Ph. D., Professor of Chemistry, Hygienic Laboratory, United States Public Health Service, now Johns Hopkins University. 1926-27.

Nelson Antrim Crawford, M. A., Director of Information, in Charge, Office of Information, 1926-28.

R. O. E. Davis, Ph. B., Ph. D., Senior Chemist, Division of Fertilizer Technology, Bureau of Chemistry and Soils. 1932-33.

W. Edwards Deming, B. S., M. S., Ph. D., Associate Physicist, Division of Physics and Physical Chemistry, Bureau of Chemistry and Soils. 1933-34.

William W. Diehl, B. A., M. S., Associate Pathologist, Bureau of Plant Industry. 1932-33.

Charles Drechsler, B. S., M. S., Ph. D., Pathologist,
Diseases of Truck Crops and Ornamentals, Bureau of
Plant Industry. 1927-29, 1930-34.

Everett E. Edwards, B. A., A. M., Associate Agricultural
Economist, Agricultural History, Division of Statistical
and Historical Research, Bureau of Agricultural Economics.
1927-32, 1933-34.

M. J. B. Ezekiel, M. S., Ph. D., Senior Agricultural Economist,
Bureau of Agricultural Economics, Economic Adviser to the
Secretary, 1926-30.

M. S. Eisenhower, B. S., Director of Information, in Charge
Office of Information. 1929-31, 1932-33.

J. R. Fleming, B. S., Assistant Director, Office of Informa-
tion. 1930-31.

H. L. J. Haller, Ch. E., Ph. D., Senior Chemist, Insecticidal
Plants, Bureau of Chemistry and Soils. 1933-34.

Malcolm M. Haring, A. B., A. M., Ph. D., Professor of Chemistry,
University of Maryland. 1929-30, 1931-33.

F. J. Hosking, B. S., M. S., Agricultural Economist, Market News
Service, Bureau of Agricultural Economics. 1931-34.

Paul E. Howe, B. S., M. A., Ph. D., Senior Chemist, in Charge
Animal Nutrition, Bureau of Animal Industry, 1930-31, 1933-34.

H. B. Humphrey, B. S., Ph. D., Principal Pathologist, Cereal Dis-
eases, Bureau of Plant Industry. 1926-34.

W. J. Humphreys, A. B., C. E., Ph. D., Principal Meteorologist
in Charge, Meteorological Physics, Weather Bureau. 1926-27.

M. A. Jull, B. S., A. M., M. Sc., Ph. D., Senior Poultry Husband-
man in Charge, Poultry, Bureau of Animal Industry. 1928-29.

W. B. Kemp, Ph. D., Professor of Agronomics and Genetics, Assist-
ant Dean, College of Agriculture, Associate Agronomist, Univer-
sity of Maryland. 1927-33.

C. H. Leineweber, Ph. D., Professor of German, American University.
1928-34.

Burton E. Livingston, B. S., Ph. D.; Plant Physiology,
Johns Hopkins University. 1928-29.

Curtis F. Marbut, B. S., A. M., LL. D., D. Sc., Principal
Soil Scientist in Charge, Soil Survey, Bureau of Chemistry
and Soils. 1927-29, 1930-31, 1933-34.

S. H. McCrory, C. E., A. E., Chief Bureau of Agricultural
Engineering, 1927-28.

Fugh C. McPhee, B. S., M. S., Sc. D., Senior Animal Husband-
man in Charge, Genetics, Bureau of Animal Industry. 1927-28.

M. C. Merrill, S. M., A. M., Ph. D., Chief, Division of Pub-
lications, Office of Information. 1931-33.

John F. Moore, LL. B., Attorney, Office of the Solicitor. 1933-34.

S. R. Newell, B. S., M. S., Agricultural Statistician, Crop
and Live-stock Reports, Bureau of Agricultural Economics.
1928-29.

C. H. Popenoe, B. S., Associate Entomologist in Charge,
Berry Insects, Bureau of Entomology. 1930-32.

C. M. Purves, B. A., M. A., Senior Agricultural Economist,
Bureau of Agricultural Economics. 1926-28, 1929-34.

C. F. Sarle, B. S., M. S., Agricultural Statistician, Crop
and Live-stock Reports, Bureau of Agricultural Economics.
1928-29, 1930-31.

Edmund C. Shorey, A. B., M. A., D. Sc., Senior Biochemist,
Biochemical Investigations of Soils and Fertilizers, Bureau
of Chemistry and Soils. 1926-27.

B. R. Stauber, B. A., M. A., Assistant Agricultural Economist,,
Land Appraisal and Land Value, Bureau of Agricultural Econom-
ics. 1931-34.

Alexander Sturges, B. S., Junior Agricultural Economist, Sta-
tistics and Statistical Analysis, Bureau of Agricultural
Economics. 1932-34.

Jason R. Swallen, B. A., M. S., Junior Botanist, Grass Inves-
tigations, Bureau of Plant Industry. 1927-28.

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U.S. Bureau of fisheries.

Refrigeration of fish.

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Reviews

Charles Thom, A. B., A. M., Ph. D., Principal Mycologist
in Charge, Soil Microbiology, Bureau of Chemistry and
Soils. 1930-32.

E. R. Tolley, B. S., A. B., Principal Agricultural Economist,
Division of Farm Management. 1926-30

L. Volin, A. B., A. M., Ph. D., Assistant Agricultural
Economist, Foreign Competition and Demand. 1933-34.

H. J. Wadleigh, B. Sc. (Econ.), M. A., Associate Agricultural
Economist, Foreign Agricultural Service, Bureau of Agri-
cultural Economics. 1933-34.

M. C. Wilson, B. S. A., Senior Agriculturist, Extension
Studies. 1932-34.

1. The first part of the paper is devoted to a general
discussion of the problem. It is shown that the
problem is of great importance and that it has
not been completely solved. The author then
presents a new method for solving the problem.
The method is based on the use of the
variational principle. It is shown that the
method is very simple and that it can be
applied to a wide range of problems. The
author then gives some numerical results
and compares them with the results of other
methods. It is shown that the new method
gives results which are in good agreement
with the results of other methods. The
author then concludes that the new method
is a very useful tool for solving the
problem.